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## PATENT COOPERATION TREATY

### PCT

#### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 20302850KC	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. PCT/SG2003/000276	International Filing Date (day/month/year) 21 November 2003	Priority Date (day/month/year) 21 November 2003
International Patent Classification (IPC) or national classification and IPC Int. Cl. <sup>7</sup> G10G 3/04, G10L 11/04, G11B 31/00, G06F 17/00, G10H 7/00		
Applicant AGENCY FOR SCIENCE, TECHNOLOGY AND RESEARCH et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheet(s).

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 28 June 2005	Date of completion of the report 9 September 2005
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer  J.W. THOMSON Telephone No. (02) 6283 2214

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## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SG2003/000276

### I. Basis of the report

1. With regard to the elements of the international application:\*

- ☐ the international application as originally filed.
- ☒ the description, pages 1-13, as originally filed,  
pages , filed with the demand,  
pages , received on with the letter of
- ☒ the claims, pages 14-16, as originally filed,  
pages , as amended (together with any statement) under Article 19,  
pages , filed with the demand,  
pages 17-18, received on 24 August 2005 with the letter of 24 August 2005
- ☒ the drawings, pages 1-10, as originally filed,  
pages , filed with the demand,  
pages , received on with the letter of
- ☐ the sequence listing part of the description:  
pages , as originally filed  
pages , filed with the demand  
pages , received on with the letter of

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SG2003/000276

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Claims 1 – 31	YES
	Claims	NO
Inventive step (IS)	Claims 1 – 31	YES
	Claims	NO
Industrial applicability (IA)	Claims 1 – 31	YES
	Claims	NO

**2. Citations and explanations (Rule 70.7)**

Citations

D1: WO 2001/069575 A1 (Perception Digital Technology (BVI) Ltd) 20 September 2001

D2: WO 2003/028004 A2 (The Regents of the University of Michigan) 3 April 2003

D3: US 6121530 A (Sonoda) 19 September 2000

D4: US 5739451 A (Winsky et al) 14 April 1998

D5: WO 2001/050354 A1 (Woo) 12 July 2001

D6: LU et al. 'A New Approach to Query by Humming in Music Retrieval' in ICME 2001, Tokyo, August 2001. (Retrieved on 23 January 2004) Retrieved from the Internet  
<URL: [http://research.microsoft.com/asia/dload\\_files/group/mcomputing/ICME01\\_QBH\\_LieLu-4th.pdf](http://research.microsoft.com/asia/dload_files/group/mcomputing/ICME01_QBH_LieLu-4th.pdf)>

Novelty (N) and Inventive Step (IS) of Claims 1 to 31

The claimed invention is novel and inventive when compared to prior art documents D1 to D6 as none of those documents discloses all of the essential features of the claimed invention.

Industrial Applicability (IA) of Claims 1 to 31

The claimed invention has industrial applicability in the field of data retrieval, in particular digital music management.

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each of the plurality of stored data point sequences in the database.

25. Computer usable medium comprising a computer program code that is configured to cause at least one processor to execute on or more functions for raising a query to compare an input melody with a plurality of melodies each stored in a database as a stored sequence of points in a value-run domain by:
- (a) converting the input melody to a pitch-time series;
  - (b) approximating the pitch-time series to a sequence of line segments in a time domain;
  - (c) mapping the sequence of line segments in the time domain into a sequence of points in a value-run domain; and
  - (d) comparing the sequence of points in the value-run domain for the input melody with each of the stored sequence of points in the value run domain of the plurality of melodies to determine a stored melody of the plurality of melodies that matches the input melody.
26. A method for raising a query to compare an input melody with a plurality of melodies each stored in a database and stored as a melody skeleton, the method comprising:
- (a) converting the input melody to an input melody skeleton by:
    - (i) converting the input melody to a pitch-time series;
    - (ii) approximating the pitch-time series to a sequence of line segments in a time domain;
    - (iii) mapping the sequence of line segments in the time domain into a sequence of points in a value-run domain; and
    - (iv) using extreme points in the sequence of points to form the input melody skeleton; and
  - (b) comparing the input melody skeleton with the melody skeleton of each of the plurality of melodies to determine a stored melody of the plurality of melodies that matches the input melody.
27. A method as claimed in claim 26, wherein each of the melody skeletons of the plurality of stored melodies is formed by:
- (a) converting the stored melody to a pitch-time series;

- 5 (b) approximating the pitch-time series to a sequence of line segments in a time domain;
- (c) mapping the sequence of line segments in the time domain into a sequence of points in a value-run domain; and
- (d) using extreme points in the sequence of points to form the melody skeleton.

10 28. A method as claimed in claim 26, wherein pitch values are measured as relative pitch, in semitones; and in step (a) a non-pitch part is replaced by an immediately previous pitch value.

15 29. A method as claimed in claim 27, wherein in step (a) a non-pitch part is replaced by an immediately previous pitch value; and pitch values are measured as relative pitch, in semitones

30. A method as claimed in claim 26, wherein non-extreme points in the sequence of points are not considered in the matching process.

20 31. A method as claimed in claim 27, wherein non-extreme points in the sequence of points are not considered in the matching process.

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